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# Java™ Platform Micro Edition MIDP 2.0 Client Design for Digital Video Broadcast

**Erich Izdepski**

Technology Strategist  
Sprint Nextel  
[www.sprint.com](http://www.sprint.com)

TS-3310

# Goal

Explore key technologies behind mobile video and identify opportunities for the Java ME Platform

# Agenda

## What Is DVB-H?

Video and Audio Encoding

Client Hardware/Software Requirements

Client UI Design

Interactive Video Applications

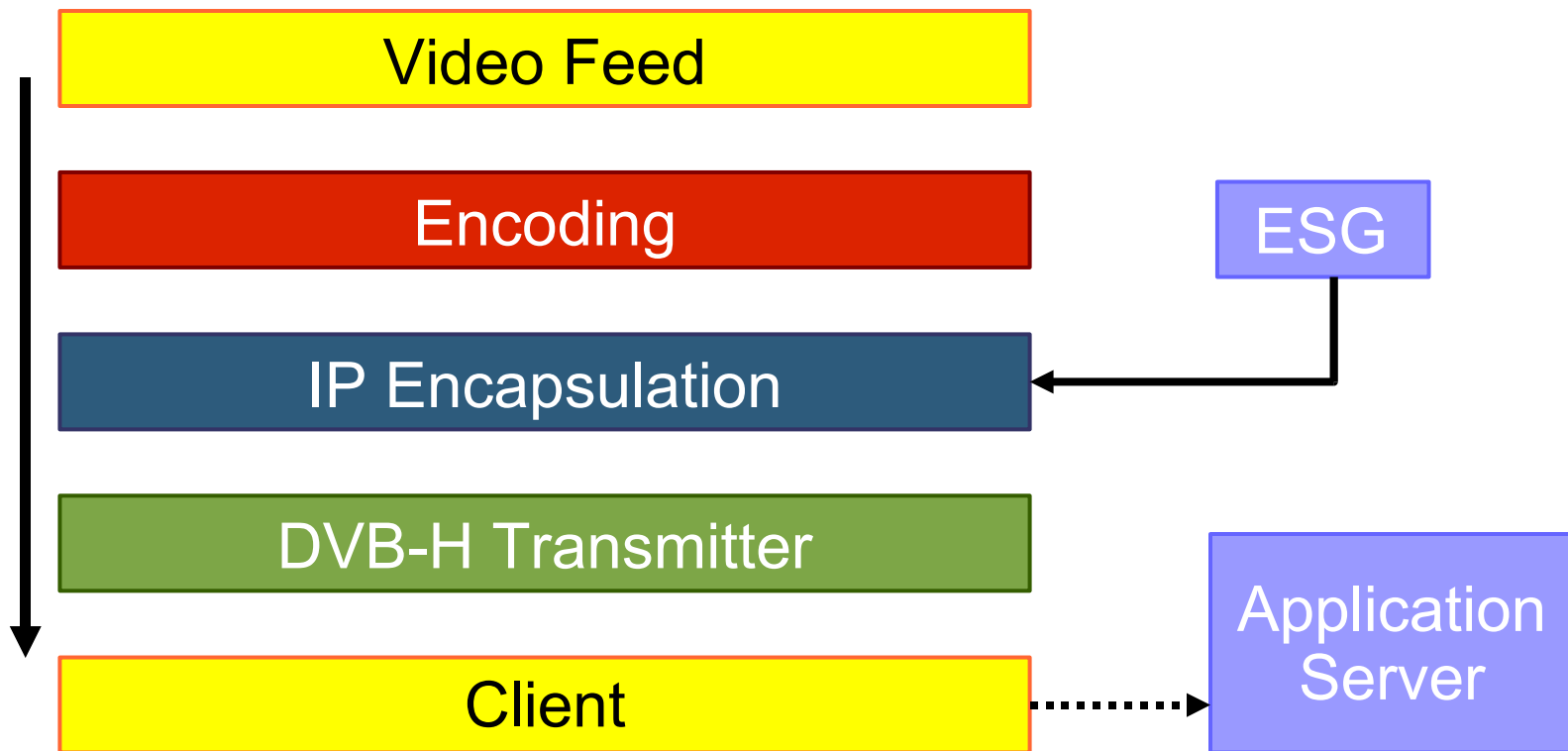
Future Directions

# What Is DVB-H?

- **Who?** [www.dvb-h-online.org](http://www.dvb-h-online.org)
- **What?** Digital video broadcast-handheld
- **Where?** Worldwide
- **Why?** Ultimately ARPU
- **How?** That's what we are here for...

# What Is DVB-H?

## High-Level Architecture



# What Is DVB-H?

## More Details

- What was left out
  - DRM
    - Keys
    - Encryption
  - Client files
    - SDP or NSC for tuning in
  - Service management
  - Carrier integration
    - A series of talks on its own

# Agenda

What Is DVB-H?

**Video and Audio Encoding**

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# Video and Audio Encoding

## Factors

- Video codec
  - Resolution
  - Frame rate
  - Advanced settings
- Audio codec
  - Sampling rate
  - Resolution

**Best Perceived Quality for the Lowest Data Rate**



# Video and Audio Encoding

## Choices

- Codec testing
  - Quantitative
  - Qualitative
- Tradeoffs
  - Audio environment
  - Resolution
  - **Number of channels vs. channel quality**

# Agenda

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# Client Hardware/ Software Requirements

- Hardware
  - Minimum 15 FPS (20 preferred)
  - QVGA, 24-bit color
  - Stereo audio, 16-bit, 44.1 KHz
- Software
  - MIDP 2.0, CLDC 1.1
  - JSR 135, 234 with DVB-H support
  - JSR 272 (forthcoming) or a subset
  - Desired audio and video support

# Agenda

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# Client UI Design

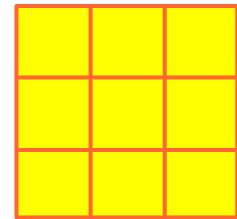
## Video Client Feedback

- Feedback was collected from several sources
  - Focus groups
  - Analysts' reports on available products
  - Internal analysis of available products
- Guiding principles were established
  - **Ease of use**
  - **Aid in finding new programs**
  - **Quality viewing experience**

# Client UI Design

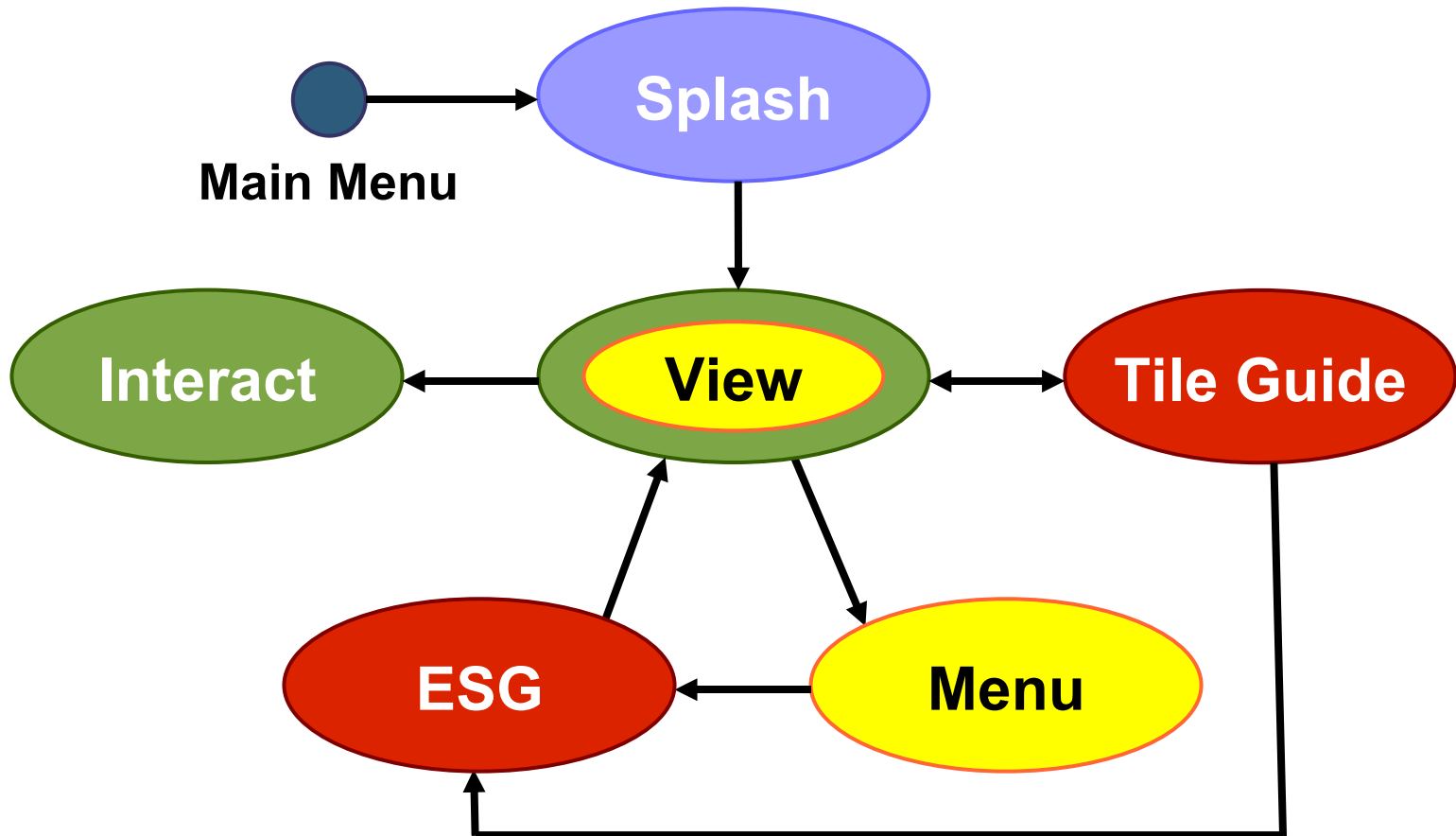
## Key Points

- Users want to view programs right away
  - Start up on last channel
- Small number of favorite channels
  - Use simple channel “tiles” with icons →
  - Channel “grid guide” (ESG) is secondary
- Add support for interaction
- Broadcast in QVGA



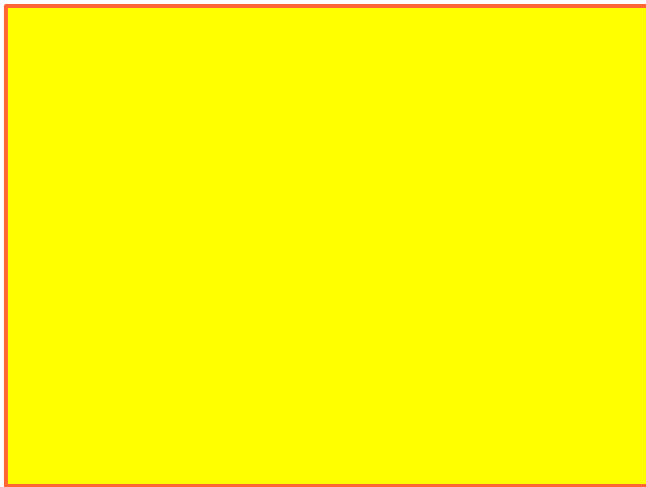
# Client UI Design

## Client Navigation

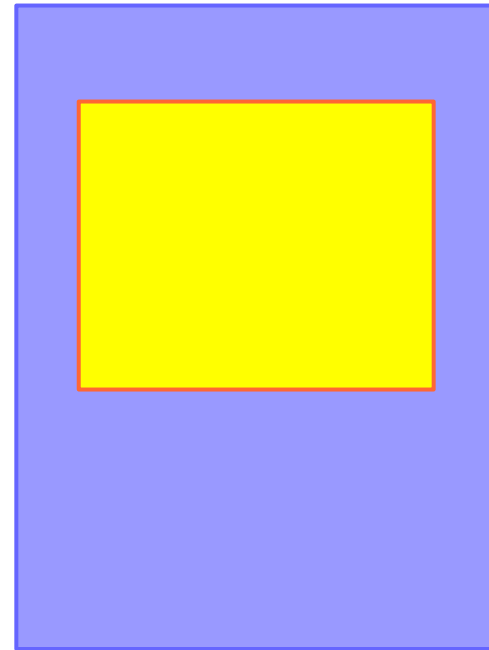


# Client UI Design

## Form Factor



QVGA—320 x 240  
Full Screen Mode



QCIF—176 x 144  
Small Screen Mode



# Agenda

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**Interactive Video Applications**

Future Directions

# Interactive Video Applications

## Today

- Most common interactive application
  - The electronic service guide
- Using a phone or web browser to vote
  - Simple calls or text messaging
- Least standardized area of mobile video

**Great Opportunity Exists!**

# Interactive Video Applications

## The Sky's the Limit!

- Messaging
  - Send program link (viral model)
  - Voting, text chat
- Data feeds
  - Overlay RSS feed, weather, etc., onto video
- Hyperlinks
  - Shopping
  - Launch browser to learn more
- Content discovery
  - Video search

# Interactive Video Applications

## Dynamic Content Generation

- Create video from still images, audio, and text
- Text can be news, trivia, etc.
- Choose media based on popularity (sales)

## How?

- Prototyped using the QuickTime SDK for Java™ Platform

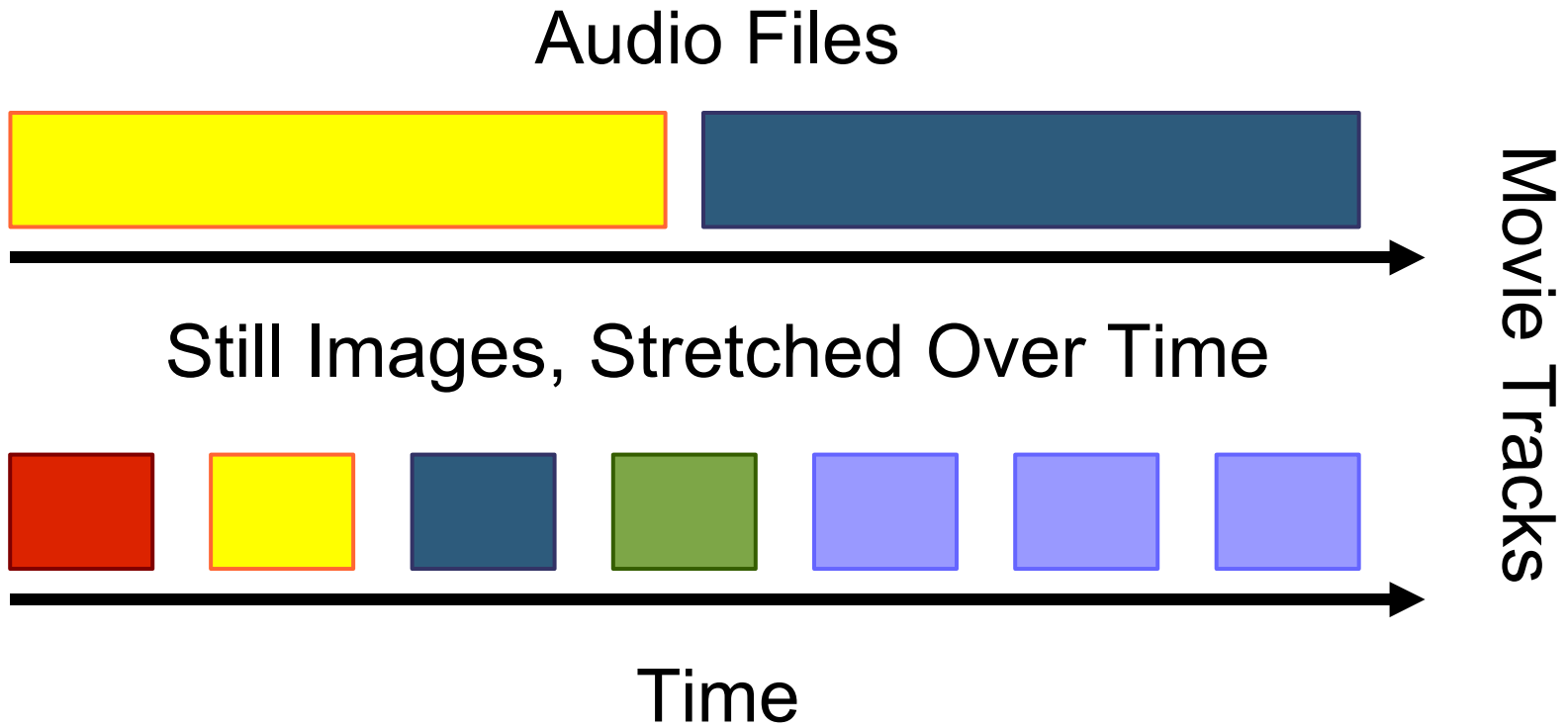
# Interactive Video Applications

## Dynamic Content Generation

- Needs
  - Media store (database or a file system)
  - Additional meta data (recent news)
  - QuickTime Java SDK
- Basic Steps
  - Add audio files, still images with text to movie
  - Render the movie and export for broadcast
  - Create movie meta data (what is playing when)

# Interactive Video Applications

## Dynamic Content Generation



# Agenda

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**Future Directions**

# Future Directions

- New interaction models
  - Gaming
  - Advertising
  - Location awareness
- Service management systems
  - **Better integration with telecom systems**
- Hardware improvements
  - Video decoding
  - DRM functions



# Summary

- Mobile video is here
- Many ways to be part of the ecosystem
- Java technology has client and back-end opportunities

# For More Information

## Specifications, etc.

- JSR 272—Mobile Broadcast Service API for Handheld Terminals
- Digital Video Broadcasting Project: [www.dvb-h-online.org](http://www.dvb-h-online.org)
- FLUTE—File Delivery over Unidirectional Transport (RFC 3926)
- Digital Video Broadcasting Transmission System for Handheld Terminals (ETSI EN 302 304)
- Digital Video Broadcasting Specification for Data Broadcasting (ETSI EN 301 192)
- Service Guide for Mobile Broadcast Services, OMA-TS-BCAST\_ServiceGuide-V1\_0\_0-20050512-D

# Helpful Tools

Video Clients, Servers, Editors, Encoders

- VLC [www.videolan.org](http://www.videolan.org)
- Apple QuickTime for Java
- Microsoft Windows Media Encoder
- VirtualDub [www.virtualdub.com](http://www.virtualdub.com)

# Q&A



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